

## **IN THE SPECIFICATION**

*Please insert the following paragraph on page 1 after the title of the invention and before the "Technical Field":*

### **--CROSS REFERENCE TO RELATED APPLICATIONS**

This application is a U.S. national phase of PCT international application PCT/JP2005/022642, filed December 9, 2005, which claims priority from Japanese patent application 2004-362657, filed December 15, 2004.--

*The following paragraphs will replace all prior versions of them in the specification of the application.*

1) Please amend the paragraph on page 1, beginning at line 13, as follows:

In recent years, portable equipment has become smaller in size and lighter in weight, and accordingly there has been increasing demand for lithium-ion secondary batteries having light weight and high energy density. While such batteries have the above-mentioned advantages, they tend to ~~be deteriorated~~ deteriorate when they are left at high temperatures because they include electrolyte containing an organic solvent. In particular, when the battery is left at high temperatures in a state in which it is charged to 100%, the electrolyte is decomposed on the surface of the positive electrode to generate gases, resulting in increasing the inner pressure. As a result, the battery may be expanded and deformed.

2) Please amend the paragraph beginning on page 1, line 23 through page 2, line 11, as follows:

In order to solve this problem, for example, Japanese Patent Unexamined Publication No. 2002-56900 discloses the following configuration. That is to say, a temperature sensor is fixed on the outer surface of a battery, and when a temperature of the battery is not lower than a predetermined temperature and a voltage is not lower than a predetermined voltage, the battery is discharged through a discharge resistor inside a battery pack. Thereby, the voltage of the battery is reduced. However, this configuration does not have a function of displaying an error message. Therefore, a user of portable equipment does not notice that the remaining capacity of the battery is reduced because the battery is discharged in order to avoid an abnormality. When the portable equipment is a portable telephone, the user may simply ~~misrecognize~~ not recognize that the deterioration of the battery shortens the standby time and therefore the battery needs to be replaced by a new one. Furthermore, the user may repeat the ~~similar~~ misrecognition after the battery is replaced with a new one because there is no opportunity to know what the abnormal state ~~to~~ of a battery is like.

3) Please amend the paragraph beginning on page 2, line 23 through page 3, line 23, as follows:

The present invention provides a power supply system for portable equipment having a function of forcedly avoiding an abnormality when the battery reaches an ~~abnormality~~ abnormal state regardless of whether the power supply is on or off and further informing a user that the abnormality has been avoided. The power supply system for portable equipment of the present invention includes a notification portion, a power supply, a temperature detection portion, a voltage detection portion, a memory portion and a forced discharge portion. The power supply includes a lithium-ion secondary battery. The temperature detection portion detects a temperature of the power supply. The voltage detection portion detects a voltage of the power

supply. The memory portion stores a first temperature that is a control operating temperature, a first voltage that is a control operating voltage and a second voltage that is a control termination voltage smaller than the first voltage. The forced discharge portion recognizes that the power supply is abnormal when the temperature of the power supply detected by the temperature detection portion is not lower than the first temperature and the voltage of the power supply detected by the voltage detection portion is not lower than the first voltage. Then, the forced discharge portion electrifies the notification portion by the power supply and makes the notification portion notify a message indicating that an abnormality is being avoided. Furthermore, the forced discharge portion forcibly discharges the power supply until the voltage of the power supply detected by the voltage detection portion reaches the second voltage. With this configuration, when a state in which a battery is exposed to an abnormal environment is detected from temperature and voltage, the battery is forcibly discharged. Thus, the generation of gases inside the battery is avoided at an early stage so as to prevent the battery expansion and deformation, and meanwhile the notification portion ~~is made notify~~ notifies that forced discharge is being carried out, thereby remarkably improving the convenience for a user.

4) Page 4, please delete lines 10-20 in their entirety as follows:

**~~REFERENCE MARKS IN THE DRAWINGS~~**

- ~~1——temperature detection portion~~
- ~~2——power supply (lithium-ion secondary battery)~~
- ~~3——voltage detection portion~~
- ~~4——display portion (notification portion)~~

~~5, 11~~—switch

~~6, 16~~—control portion

~~7~~—memory portion

~~8~~—portable telephone

~~9, 19~~—power supply system

~~10~~—equipment circuit

5) Please amend the paragraph beginning on page 5, line 18 through page 6, line 10, as follows:

Memory portion 7 has a nonvolatile memory and stores control operating temperature T1 that is the first temperature, control operating voltage V1 that is the first voltage, and control termination voltage V2 that is the second voltage. The value of V2 is smaller than the value of V1. Control portion 6 controls switch 5 so as to forcibly discharge power supply 2 when both  $T \geq T1$  and  $V \geq V1$  are satisfied, even in the case where the power feed from power supply 2 to circuit 10 is off. Thus, display portion 4 is electrified. Then, control portion 6 makes display portion 4 display a message indicating that an abnormality is being avoided. Discharge of power supply 2 proceeds according to this displayed message-~~displaying~~, and the forced discharge is terminated at the time when voltage V reaches V2. Thus, control portion 6 and switch 5 constitute a forced discharge portion for forcibly discharging power supply 2. That is to say, the forced discharge portion recognizes that the state of power supply 2 is abnormal when the temperature of power supply 2 detected by temperature detection portion 1 is not lower than T1 and the voltage of power supply 2 detected by voltage detection portion 3 is not lower than V1. At this time, the forced discharge portion electrifies display portion 4 by power supply 2 and makes display portion 4 display a message indicating that the abnormality is being avoided.

Then, until the voltage of power supply 2 detected by voltage detection portion 3 reaches  $V_2$ , power supply 2 is forcedly discharged.

6) Please amend the paragraph beginning on page 9, line 8 as follows:

Control portion 16 turns on switch 11 and forcedly discharges power supply 2 when both  $T \geq T_1$  and  $V \geq V_1$  are satisfied in a state in which switch 11 is turned off and the power feed from power supply 2 to circuit 10 of portable equipment 8 is off. Then, control portion 16 makes display portion 4 display a message indicating that an abnormality is being avoided. Discharge of power supply 2 proceeds according to the displayed message-~~displaying~~ and electrification of circuit 10, and at the time voltage  $V$  reaches  $V_2$ , the forced discharge is terminated. Thus, control portion 16 and switch 11 constitute a forced discharge portion for forcedly discharging power supply 2. That is to say, the forced discharge portion recognizes an abnormality of power supply 2 when the temperature of power supply 2 detected by temperature detection portion 1 is not lower than  $T_1$  and the voltage of power supply 2 detected by voltage detection portion 3 is not lower than  $V_1$ . At this time, the forced discharge portion electrifies display portion 4 by power supply 2 through circuit 10 and makes display portion 4 display a message indicating that an abnormality is being avoided. Then, until the voltage of power supply 2 detected by voltage detection portion 3 reaches  $V_2$ , power supply 2 is forcedly discharged. Note here that control portion 16 may send a signal to circuit 10, circuit 10 may receive it and make display portion 4 display a message indicating that an abnormality is being avoided.

7) Page 12, please amend the paragraph beginning at line 7, as follows:

In the above description, the exemplary embodiment of the present invention is described on a portable telephone as an example. However, the present invention is not limited to a portable telephone and may be applied to portable equipment having a display portion, for example, a portable television, a digital still camera, a portable ~~music~~ music reproducer, and the like.

8) Page 12, please amend the paragraph beginning at line 13, as follows:

According to the present invention, storing characteristics at high temperatures, which is a disadvantage of a lithium-ion secondary battery that is has a high large capacity ~~power supply~~, can be overcome as a power supply system, and user's convenience can be radically improved. Therefore, it can be expected that the battery system is employed in portable equipment in general and the industrial applicability is extremely high.